

REMARKS

Claims 1-19 are pending in this application. Claims 1 and 16 have been amended herein. Attached hereto is a marked-up version of the changes made by the current amendment, captioned "Version with Markings to Show Changes Made."

Rejections under 35 U.S.C. §102

Claims 1-16 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,986,301 to Fukushima et al.

Fukushima et al. teaches a capacitor comprising a first electrode 242 of perovskite crystal structure, a ferroelectric film 243, and a second electrode 244 of perovskite crystal structure.

Conversely, the present invention, as herein amended, is characterized in that an intermediate layer of perovskite crystal structure is formed between an electrode and a ferroelectric film, and materials of the intermediate layer are different from materials of the electrodes and the ferroelectric film.

Applicants respectfully submit that such intermediate layer of the present invention is neither disclosed nor suggested in Fukushima et al. Therefore, the present invention can not be anticipated by Fukushima et al.

Applicants note that in the present invention, the reason why the intermediate layer of perovskite crystal structure is formed between the electrode and the ferroelectric film is for use inexpensive base metal as a material of the electrode. Base metal is a material which is not self-

aligned easily. Therefore, in a case that the ferroelectric film is formed directly on the electrode, crystal directions of the ferroelectric film are not aligned easily. Accordingly, in the case that the ferroelectric film is formed directly on the electrode of base material, it is difficult to form the ferroelectric film having good perovskite crystal structure. Furthermore, oxygen, etc. in the ferroelectric film tends to be diffused in the electrode of base metal. In the present invention, since the intermediate layer of perovskite crystal structure is formed between the electrode and ferroelectric film, it is possible to form the ferroelectric film having good perovskite crystal structure, even in the case that base metal is used as the material of the electrode.

Fukushima et al. neither teaches nor suggests using base metal as a material of an electrode. In Fukushima et al., in a case that base metal is used as the material of the electrode, oxygen in the ferroelectric film is diffused into the electrode, and the electrode is oxidized by oxygen, because the intermediate layer is not formed between the electrode and the ferroelectric film. Furthermore, in Fukushima et al., in a case that base metal is used as the material of the electrode, hydrogen (H_2O) in the outside is entered into the ferroelectric film, because the intermediate layer is not formed between the electrode and the ferroelectric film.. Therefore, in Fukushima et al., it is not possible to form the ferroelectric film having good perovskite crystal structure, in the case that base metal is used as the material of the electrode. Accordingly, in Fukushima et al., it is not possible to use inexpensive base metal as the material of the electrode.

As described above, the present invention is clearly different from Fukushima et al.

Amendment Accompanying RCE
Kenji MARUYAMA et al.

U.S. Patent Application Serial No. 09/960,296
Attorney Docket No. 011267

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees that may be due with respect to this paper to Deposit Account No. 01-2340.

Respectfully submitted,

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PATENT TRADEMARK OFFICE

Enclosures: Version with Markings to Show Changes Made

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Amendment Accompanying RCE
Kenji MARUYAMA et al.

U.S. Patent Application Serial No. 09/960,296
Attorney Docket No. 011267

VERSION WITH MARKINGS TO SHOW CHANGES MADE

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IN THE CLAIMS:

Please amend claims 1 and 16 as follows:

1. (Amended) A semiconductor device comprising a first electrode, a ferroelectric film formed above the first electrode, and a second electrode formed above the ferroelectric film, further comprising

an intermediate layer of perovskite crystal structure formed at least one of boundary between the first electrode and the ferroelectric film, and boundary between the ferroelectric film and the second electrode, materials of the intermediate layer being different from materials of the first electrode, the second electrode and the ferroelectric film.

16. (Amended) A semiconductor device comprising a capacitor including a first electrode, a ferroelectric film formed above the first electrode, and a second electrode formed above the ferroelectric film; and a transistor connected to the first electrode or the second electrode and the ferroelectric film, and boundary between the ferroelectric film and the second electrode, materials of the intermediate layer being different from materials of the first electrode, the second electrode and the ferroelectric film.